Recalling IBIS: Can Argumentation be Disciplined?

Full Paper

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Abstract

Issue-based information systems (IBIS) were conceived in the early 1970s as a tool that lent discipline to a planning process in a public context marked by argumentation. Now, years later, I revisit IBIS and its philosophy and history and seek insight into its lessons. I find that whether argumentation can be disciplined as with IBIS is at its heart a never-ending story of the conflict between rationality and politics.

Keywords

Issue-based information systems, IBIS, argumentation, IS history, IS philosophy

Introduction

The late 1960's were famously marked by political turmoil, in particular, the anti-Vietnam war movement, which dominated life on many college campuses. Demonstrations, ad hoc "teach-ins" and vociferous argument around ending the war prevailed. At the University of California, Berkeley, the Free Speech Movement of 1964-65 had given particular impetus to impassioned political argumentation. But it was also here that the seeds for a disciplined argumentation were sown.

Issue-based information systems (IBIS), which today remain little known among traditional management information systems (MIS) researchers, were conceived in the early 1970s as a tool that lent discipline to a planning process in a public context marked by argumentation. IBIS envisioned a cooperative process for rational argument, rather than the disruptive one characteristic of the times. Its philosophical roots took important hold in Berkeley.

It was my own good fortune to have worked with those at Berkeley and elsewhere who pioneered with IBIS and related research. Now, some four decades later, it seems timely to revisit these early years, in the light of where we have now arrived. Can argumentation be disciplined? The history of IBIS and its origins and related developments may have something to teach us. In this paper, partly in the form of a short memoir, I contribute to the telling of the story and seek insight into its lessons. At the same time, I attempt to provide something of a historical trace for those interested in the philosophical foundations of IS.

Berkeley Days

I began my doctoral studies at UC Berkeley's School of Business Administration in January, 1968. With a self-declared concentration in information science, and also drawn to what was termed "general systems research," I soon found my way to West Churchman. West would eventually be my dissertation chair. I would finish up my studies at Berkeley in June 1972.

Schooled in the philosophy of logic and one of the founders of the field of operations research, Churchman took a position at Berkeley in 1957. By the 1960's he was focusing his work on the philosophical underpinnings of management science. At the time of my arrival, he had taken an interest in information systems and was also finishing up his masterwork on *The Design of Inquiring Systems* (1971). He would eventually retire in 1996. Mason and Mitroff (2015) and Porra (2001) provide biographical background.

The breadth of Churchman's interests brought him into contact with scholars across the Berkeley campus. In 1963 he helped establish a Social Sciences Program at Berkeley's NASA Space Sciences Laboratory, and began a legendary seminar series that brought faculty together around problems in areas such as urban planning, ecology, forestry, and criminology. A contributor to this series was Horst Rittel of the College of Environmental Design. In 1967, Rittel gave a talk on social problems and how they differed from scientific or technical ones. Churchman was much taken with Rittel's critique and published it as a guest editorial in *Management Science* (Churchman, 1967).

The notion of "wicked problems" was thus born (Skaburskis, 2008). In Rittel's (1972) characterization, with wicked problems: (1) There is no definitive formulation; (2) Every formulation corresponds to a statement of the solution and vice versa; (3) There is no stopping rule in the search for a solution; (4) There are no criteria for a solution's correctness or falsity; (5) There is no exhaustive, enumerable list of permissible operations or actions to undertake; (6) There are many explanations for the discrepancy marking the problem; (7) Every problem can be considered a symptom of another; (8) There is neither an immediate nor an ultimate test to the solution; (9) Each problem is a one-shot operation; (10) Every problem is unique; (11) The problem solver has no right to be wrong. Designers are responsible for their work. Rittel and Webber (1973) elaborated on wicked problems in what became a landmark publication in the policy sciences.

The notion that most important problems are "wicked" with moral ramifications tied closely to Churchman's own work on articulating the "conditions for conceiving something to be a system" (Churchman, 1971) where the designer is swept in and, moreover, charged with articulating the "guarantor" for the integrity of the conception (Swanson, 1994). The moral foundations for both Churchman's and Rittel's and their students' subsequent work on information systems were thus set. In their own respective rational formulations, argumentation would be found to play an important role. Most notably, the dialectics of Hegel, one of the philosophical heroes in Churchman's system thinking, would inspire the doctoral research of Richard Mason (1969) on strategic counterplanning. Mason would go on to build out this line of work on "policy as argument" in collaboration with Ian Mitroff, also a Churchman student (Mason and Mitroff, 1980; Mitroff, Mason, and Barabba, 1982; and Mitroff and Mason, 1982). Together, they would also author a classic foundational work on IS (Mason and Mitroff, 1973). Rittel and his students, however, would take an alternative direction.

Born in Berlin, Horst W. J. Rittel was a faculty member of the Ulm Hochschule für Gestaltung, a college of design, before moving to UC Berkeley in 1963. At the time of my own studies at Berkeley, Rittel was also an advisor to the Studiengruppe für Systemforschung (SfS), a small research organization located in Heidelberg. It was here as well as in Berkeley that his approach to addressing wicked problems would be played out in the form of issue-based information systems (IBIS).

My own dissertation studies at Berkeley addressed management information systems (MIS) and their discretionary use, and why some managers would make use of them while others would not (Swanson, 1974). While Churchman chaired my committee, Rittel served as the outside member. Interested in his ideas, I attended a number of his seminars, and came to know him. As my time at Berkeley wound down, Horst mediated an offer to me to join the SfS in Heidelberg as a guest scientist, to continue my own work and collaborate with others there, where work on IBIS was already underway. I took the offer.

Encountering IBIS

With roots dating to 1957, the publically-funded Studiengruppe für Systemforschung was founded to conduct technology assessments and address socially-related issues of post-war research and development in then West Germany. Helmut Krauch, who would later come to know Churchman in 1964 through a stay in the U.S., played perhaps the most important role in the SfS founding and served as an early leader. Rittel, then at Ulm, received an appointment to the SfS, as did Werner Kunz, who later became director of the SfS section conducting research on information and documentation in the public sector. In 1972, my own appointment was to this section.

I arrived in Heidelberg in late August 1972 and quickly settled into an upstairs office in a small converted residence in the Neuenheim sector. My office mates for the next two years were Hans-Joachim Matner, Wolfgang Schuler, and Gisela Roth. They and others in Kunz's section worked on a variety of problems, with a focus on IBIS, in particular.

The notion of an "issue-based information system" was articulated by Rittel in collaboration with Kunz in a classic working paper (Kunz and Rittel, 1970). IBIS were "meant to support the work of cooperatives, like governmental or administrative agencies or committees, planning groups, etc., that are confronted with a problem complex in order to arrive at a plan for decision." (p. 1) The concept rested on a model of problem solving as an argumentative process. Around a topic, a discourse would be developed. *Issues* of different types (factual, deontic, explanatory, and instrumental) would be brought up and disputed. Positions would be taken. Evidence would be solicited as needed. Relationships among issues and related elements would be identified. Subsystems included: an issue bank; an evidence bank; a handbook of model problems; a topic list; an issue map; and a documentation system. At the time, three manually operated versions were in experimental operation by governmental agencies and computerization was in preparation.

In sum, IBIS was to be a tool for disciplined argumentation around wicked problems. Its intellectual roots were in the production of instrumental, politically useful, knowledge, as distinct from scientific knowledge (Rittel, 1970). Rittel was quite aware that any tool such as IBIS presented risks, but he argued, "The only possibility of improving the condition humaine lies in the generation of instrumental knowledge of a high level. The price for this is the dangerousness of this kind of knowledge. We have to learn to live with such tools and to carry the burden of their development." (Rittel, 1970, unnumbered last page).

Fundamentally, the IBIS concept constituted a contribution to design science, as distinct from traditional science. As a tool, it would be put to the test in its various experimental implementations. At the time of my arrival in Heidelberg, perhaps the most ambitious implementation was underway in the form of UMPLIS (Umwelt-Planungs-Informationssystem), an environmental planning IS to serve the new Umweltbundesamt (UBA) founded in 1971 and then being established in Berlin. Wolf Reuter served as the project leader for the development of UMPLIS.

Kunz and Rittel (1972) made the case for UMPLIS as "first and foremost a vehicle for the coordination and communication for all those concerned with environmental problems, in particular for those responsible for environmental policy." (p. 8). Among its specifications, UMPLIS was to be public in principle, and serve as an information go-between between its users, drawing as needed upon factual services provided by others, while representing the state of environmental problems through a problem bank with associated argumentation. The heart of UMPLIS was its switchboard and problem bank (subsystem 1). Its resources were a bank of sources; an expert bank; a databank for critical environmental variables; a project bank; a bank of methods and models; a bank of environmental laws; a bank of standards; a databank for crisis management; and a databank for impacts of products and production processes (subsystems 2-10). It would also feature its own management and development system (subsystem 0).

While I did not work directly on the UMPLIS project, I sat in on a number of its meetings. It was obvious that it was an enormously ambitious effort. From my own research, I was primarily curious and concerned about what would motivate UMPLIS use once it was implemented. I worried some that it might become a "useless information system" (UIS), a tongue-in-cheek concept that I presented in a seminar at Rittel's Institut für Grundlagen der Planung in Stuttgart. The essence of a UIS is that it is so perfectly designed by a designer distanced from any of its intended users that upon implementation it will suit no one at all (see Swanson, 1973).

As it turned out, UMPLIS did not at all become useless. Rather it was never implemented as originally conceived. The problem bank for argumentation around environmental issues was dropped, as was the notion that the public could engage in such argumentation. The switchboard concept for external communications was retained as were a number of the databank sources that could be drawn upon by the UBA. The name UMPLIS was retained. An early sketch of UMPLIS as it would be implemented is included in a recent UBA history (uba.chronik, p. 42) published on the occasion of the agency's 40th year anniversary and available at its website (umweltbundesamt.de). Kunz, Rittel, and Reuter (1980) documents the development of UMPLIS.

IBIS thus never made it into practice under UMPLIS (Reuter, personal communication, January 6, 2016). The notion that a public agency might provide a system offering open access and participation in a structured discussion of issues central to its responsibilities failed in this case in its implementation. What would this auger for the future of IBIS?

In the second year of my work at the SfS, I began to think about returning to the U.S. and taking a faculty position somewhere. I received an offer to visit at UCLA's Graduate School of Business Administration and accepted it. My position was eventually regularized and I would remain at UCLA for many years to come, through today.

Some months after I left it, the SfS itself came to an end as an independent organization. Always vulnerable as a small applied social science enterprise in the larger mix of the Federal Republic's scientific establishment, it was broken up and redistributed. Kunz's section became the Sektion für Systementwicklung (still the SfS) within the newly founded Gesellschaft für Information und Dokumentation (GID), located in Darmstadt. My former colleagues now faced a commute. (Brinckmann, 2006, provides an historical account of the SfS and the politics of its establishment, growth, and eventual demise, and Krauch, 2006, gives his personal perspective.)

Pushing Ahead

Now at UCLA, I continued consulting with my relocated colleagues on IBIS and related work, making several short visits over the next decade. I incorporated IBIS and UMPLIS design material into a course I taught on information systems. I wrote on the "sub 0" approach to information system development (Swanson, 1979). Perhaps most interesting for me, I collaborated with Wolfgang Schuler and Ray McCall in evaluating the use of MIKROPLIS as a research support system.

Raymond McCall had succeeded me as a visitor at the SfS and had developed and implemented MIKROPLIS, which was something of an offshoot of IBIS (see McCall, 1989). Conceived as a textbank management system to help professionals in collecting textual information, organizing ideas and structuring problems, it was first implemented under CPM on 16-bit microcomputers, enabling its users to create personalized IS on their desktops (Lutes-Schaab, B., et al, 1986). Microcomputers had arrived! In August 1983 I obtained my own first PC with which to experiment with MIKROPLIS under DOS. By December, with McCall's help, I had the system up and running. In April, 1984, I submitted a preliminary report on my work, and finished it up in October. Attempting to apply MIKROPLIS to one of my research projects, I had found it very tough going, but it was clear that as a type of note processing system, a concept then emerging more widely (see Halasz, Moran, and Trigg, 1986), MIKROPLIS was on the right track. It was also easy to see that the emergence of microcomputers for individual work posed something of a challenge to the IBIS concept, founded to promote discourse among individuals in a broader social context. A true IBIS could hardly be contained only on a desktop.

In 1987, I engaged in one further project, sponsored by the International Center for Information Technologies (ICIT) under the direction of Peter Keen. Returning to the issue of argumentation, believing that idea-processing tools in support of collaborative work might ultimately play an important role, I experimented with a commercial idea processor, Houdini, applying it to the analysis of a bank's strategic IT investment proposal. I specified a simple architecture for argumentation, drawing on the work of Toulmin (1958) and Mitroff, Mason, and Barabba (1982). Extracting key assertions from the bank's position paper and relating them to each other, I was able in the analysis to identify three characteristic problems associated with the position paper: unrelated assertions, ill-formed conclusions, and disconnected argument. I concluded that structured argumentation, in conjunction with traditional financial measurements, might be useful for assessing the worthiness of an organization's investment proposals (Swanson, 1987).

Others engaged in more substantial work to push ahead with the IBIS concept, developing more advanced tools. Most notably, Jeff Conklin at the MCC (Microelectronics & Computer Consortium) in Austin developed gIBIS (graphical IBIS), a hypertext system (Conklin, 1987) supporting the collaborative construction of an IBIS by members of a team spread across a local area network. Conklin and Begeman (1988) reports on its experimental small-scale use at MCC. Conklin, et al (2001) describes more recent work, which employs facilitation methods.

Jintae Lee at MIT developed SIBYL, a tool to support group decision making by managing its qualitative aspects such as goals, alternatives, and arguments in their evaluation (Lee, 1990). The explicit incorporation of goals extends the gIBIS vocabulary. Lee (1997) discusses a number of practical issues that arise with design rationale systems.

Ray McCall on completion of his visit with the SfS, took a faculty position at the Program of Environmental Design, University of Colorado, Boulder, where he continued developing and experimenting with IBIS-inspired tools, e.g., collaborating with Gerhard Fischer in the development of JANUS, which integrated issue-based argumentation with a knowledge-based system (Fischer, et al, 1989). McCall (2010) offers a summing up and evaluation of the work.

Wolf Reuter continued his work with the SfS and GID through 1981, when he took an academic position at the Institut für Grundlagen der Planung at the University of Stuttgart, founded by Rittel. There he developed and experimented with HyperIBIS, which differentiated issues in argumentation according to their type. While acknowledging that IBIS-like systems can be useful in group problem solving, three major difficulties in their promotion and application are identified: (i) the acceptance or not of the concept by responsible opinion leaders; (ii) misleading expectations, such as seeing IBIS as a consent and decision mechanism; (iii) problems in using the methods, including those with atomization and classification of knowledge items, pedantry in formulating contributions, and integration of new items into the knowledge base (Isenmann and Reuter, 1997).

Research on argumentation and its support more broadly was fairly extensive into the 1990s. Sillince and Saeedy (1997) provides a review and critique, from an organizational perspective. In a different vein, v. Werder (1999) uses a text-based analysis to explore the reasoning associated with a strategic decision made by Daimler-Benz in 1985.

What seemed to emerge from this various work through the 1980s was the notion that while IBIS might have overreached in its ambition to address important wicked problems through public argumentation, it did offer promise as a tool for designers to use in constructing structured rationales for their systems work in collaborative contexts (see Moran and Carroll, 1996, on design rationale approaches). Subsequent IBIS-based research would be conducted mostly along these lines. Perhaps IBIS's most notable success has been as a tool for software engineering (see, e.g., Dutoit, et al, 2006, and Carroll, et al, 2008). But while IBIS tools were thus mostly narrowed to varying forms of group decision and design support, public argumentation around wicked problems such as those of the environment, would find expression in other ways, and would soon spill over into a vast new arena, that of the Web.

The Wild, Wild Web

In 1984, Tim Berners-Lee had taken a fellowship at CERN and development of the World Wide Web (WWW) would follow. Seeking originally to develop a document-based system to support CERN's research over multiple projects, Berners-Lee had an early browser/editor working on his computer, communicating over the Internet with CERN's server on Christmas Day 1990. Essentially, a generalized hypertext system for the Internet had been developed, which could serve the world. By the summer of 1992, the WWW was being seen and used in many places and browsers were being developed for it. Access to the CERN server was doubling every three or four months. (Berners-Lee, 1999) Riding the Internet, the Web would become a global technology and social phenomenon like few others.

Although not by design, the Web, beyond its many other uses, would also prove to be an explosive force for minimally disciplined social argumentation. Most notably, the rise of blogs (Web logs) in the late 1990s opened the door for free-form public discussion on a wide range of social issues throughout the "blogosphere." Evolving from the simple online diary, the modern blog often allows for argumentation. Through the single simple mechanism of allowing comments to previous entries, a kind of discussion is generated, with entries usually displayed in reverse chronological order. Entry content is not categorized. Links within entries allow the discussion to reference Web content elsewhere.

Enormously popular, several hundred million blogs now populate the Web. Among the blog types are personal blogs, collaborative or group blogs, microblogs (as with Twitter), corporate and organizational blogs, and aggregated blogs (see the well-referenced Wikipedia entry on blogs). Blood (2004) and Herring, et al (2005) describe the emergence of blogs as a new communication genre on the Internet.

Blogs have also become a medium to disseminate news as well as opinion, and thus compete with mainstream media. Political candidates and their organizations now routinely use blogs for outreach and opinion forming. Concerns about the impact of blogs on society and its politics have thus been expressed. U.S. President Barack Obama is quoted as saying, "if the direction of the news is all blogosphere, all

opinions, with no serious fact-checking, no serious attempts to put stories in context, then what you will end up getting is people shouting at each other across the void, but not a lot of mutual understanding." (Wikipedia entry on blogs, accessed January 11, 2016)

But however wild the Web and its blogosphere, firms and organizations of all types now engage it, rather than ignore it. Marketers have come to realize that their firms' reputations and brands are now more in the hands of their customers than they were prior to the Web. The new ethos is to allow for and publically share customer feedback and comment, favorable or not. What is important is customer trust (see, e.g., Fournier and Avery, 2011).

Today, a rather different political climate thus exists for public engagement and argumentation, than was the case when UMPLIS was under development years ago at the SfS and UBA, as discussed above. Today, a public agency is more likely to be open to and even embrace communicative exchanges with its constituencies. As but one example, the U.S. Environmental Protection Agency (EPA) maintains an open edited blog (actually multiple blogs) on environmental matters at blog.epa.gov. At the same time, with more sophisticated and open technology, the bar has probably now been set higher for an agency to achieve public trust.

Unfortunately, Horst Rittel would not live to witness the flowering of the Web. He died prematurely in Heidelberg, on July 9, 1990. But had he still been with us, I like to think that he would have brought his innate optimism to what already is and what might remain to be accomplished with good argumentation on the Web in service of the public interest. (Jean-Pierre Protzen, who worked closely with Rittel at Berkeley, helpfully documents his life's work in Protzen and Harris, 2010. See too Rith and Dubberly, 2007.)

How then might good argumentation on the Web be furthered, so as to develop instrumental knowledge of a "very high level" as sought by Rittel? Does rationality such as that envisioned by IBIS have a future in this context?

Is Rationality Dead?

Today, rationality may not yet be dead in our public affairs, but it does often seem to be hiding. As during the political turmoil of the 1960s, argumentation seems to be everywhere, but discipline is sometimes difficult to discern. Make no mistake, it is there, however.

It is useful to remind ourselves that argumentation can in general be disciplined in several ways: (i) through the language(s) employed; (ii) through the allowable means of expression; (iii) through its allowed capture and documentation; (iv) through restrictions on allowed participants; (v) through its active direction, facilitation, and supervision; (vii) through the venue and host chosen for its expression; (viii) through an allowed time period for expression; (ix) through its subsequent editing, publication, and retention; (x) through the various tools employed.

The discipline we impose on argumentation varies widely across social settings. It is instructive to compare two apparent extremes, traditional courtroom law, with a very tight discipline, and the Web's blogosphere, where free and often wild expression appears to reign. Consider how argumentation is disciplined in both courtroom law and blogs on the listed ten points (I leave this easy exercise to the reader). What is interesting is that blogs, like courtroom law, are seen to be very much subjected to discipline on the ten points, but that the choices made range widely across the blogosphere. Many blogs are in fact tightly disciplined. Freedom of expression in the blogosphere comes mainly from the option to start one's own blog, if one is not content or able to contribute to others.

The concept of IBIS can be revisited in this light. As originally presented, it focused most fundamentally on the discipline imposed by the expression of transparent reasoned argument. The intellectual attraction resided heavily in the underlying data model for its hypertext. But each implementation of IBIS would face its own issues of discipline or lack thereof on all of the listed points. Moreover, resolution of these issues could not possibly appeal solely to reason, or be immune to politics.

Nevertheless, today, with the social triumph of blogs, it might be interesting to consider how their argument might be made more rational, a la IBIS. One approach might be to apply text analysis to their content to discern their logical structure (see, e.g., Efimova and De Moor, 2005). Another might be to

introduce structure up front, to create a rationally tailored blog (if someone is already doing this, I am not aware of it). Both approaches merit the attention of researchers. Rationality need not remain in hiding.

To conclude then, what can we say from the history of IBIS and where we have now arrived? Can argumentation be disciplined? In the spirit of Rittel, I draw three lessons.

First, *argumentation may be disciplined locally, but not globally*. All implementations of systems such as IBIS, or even blogs, are local, whatever their reach. Each can accordingly by disciplined. However, the argumentation captured has links even if implicit to argumentation elsewhere, much of it undisciplined and uncaptured. It cannot be bounded.

Second, *disciplined argumentation may be more or less rational, but never wholly rational*. Local discipline can include rational structures such as those imposed by IBIS, but as a whole it cannot appeal solely to reason. Certain of the discipline for argumentation is likely to be arbitrary, or a matter of convenience, or to reflect the self-interest of the host.

Third, *discipline of argumentation is itself a wicked problem*. The concept of a particular IBIS, or even a blog, is itself problematic and has no definitive formulation. Moreover, its implementation as a solution will always be several precarious steps removed and cannot be said to be correct or not. It will be a unique, one-shot operation. As always, the designer has no right to be wrong.

West Churchman reminds us that politics is one of the enemies of the systems approach (Churchman, 1979). Attempts to discipline argumentation through whatever rational means can be an invitation to do battle. Churchman concludes: "If the systems approach attempts to swallow the enemy be setting forth the rules of their battle- for example, in terms of a dialectic- the political enemy will retaliate by forming a counterpolis of people who will eschew the results of systems thinking, making sure it is not funded or promoted, and generally carry on a political process that will thwart systems planning" (Churchman, 1979, p. 164).

The story of IBIS over the years, and the question of whether argumentation can be disciplined, in particular in the public sphere, is at its heart a never-ending story of the conflict between rationality and politics.

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